Clipping, September 6, 1907

THE EVENING STAR, FRIDAY, SEPTEMBER 6, 1907—20 PAGES. TOWER A TETRAHEDRON Revolution in Iron Construction by Prof. Graham Bell. EMPLOYS A NEW PRINCIPLE Curious Specimen Structure on His Nova Scotia Estate. DEVELOPED FROM HIS KITES

This New Form of Truss Work Has Several Important Advantages Over the Old.

BADDECK, N. S., September 6.—Alexander Graham Bell recently opened to the public a lookout tower on his estate in Nova Scotia which is of absolutely unique construction and which demonstrates also that the principles of tetrahedral is which he has applied so successfully to the construction of his giant kites can be applied with great success to heavy iron structures. The opening ceremonies were stamped with that dramatic simplicity and picturesqueness which characterize the public appearances of the great inventor.

There are few spots in America more beautiful than the Bras d'or Lakes of Cape Breton, with their wonderful, ever-changing lights and the sloping hills that shut them in. Mr. Bell selected for his outlook a point of land on his own large estate out into the Little Bras d'Or Lake Here, 400 feet above the water, surrounded

Alexander Graham Bell.

by one of the most stunning panoramas imaginable, he gathered by invitation a select company to whom he has endeared himself both as a neighbor and as a great scientific man. They came in country wagons and carriages, driving, some of them, scores of miles across the hills to see close by the tetrahedral tower whose growth they had watched day by day from a distance. Hitching their teams to the fence posts they gathered beneath the fluttering flags of Canada and the United States which decorated the tripod structure, and listened, bareheaded, to Mr. Bell as he stood with his tall form outlined against the

background of sea and land, and told them how the idea of the tower originated as an outgrowth of his search for the lightest, strongest possible construction for his kites. He told them how, after trying all sorts of forms over which to stretch the silk, he hit upon the tetrahedron, a figure composed of four equal triangles, and how, when he found the surprising strength of the delicate wooden cells composing the kites and the case with which they could be combined into any form of structure, the question arose in his mind of what would happen if one used strong material.

Tower Is Built.

A lookout tower was needed. “Why not make it of iron tetrahedrons?” The idea seemed feasible, so, associating with him a young engineer, Mr. F. W. Baldwin of Toronto, Mr. Bell turned the matter over to him, saying, “We want a lookout tower on the top of the mountain. Take hold of this engineering problem, I must go on with my kite “experiments.”

How well he succeeded this tower attests.

Mr. Baldwin gave a brief description of the unique character of the tower and then formally turned it over to Mr. Bell by giving him the key to the stairway which leads to the platform at its apex.

A bronze tablet bearing the inscription

1907.

The Outlook Tower of Beinn Bhreagh.

The First Iron Structure Built of Tetrahedral Cells.

F. W. Baldwin Engineer.

was then unvelled by Melville Bell Grosvenor, Mr. Bell's oldest little grandchild, who also unlocked the staircase door and invited the guests to “Please come up.”

Is Immensely Strong.

The tower is truly unique in appearance; a giant widespread tripod, with triangular legs built up of tetrahedral cells formed of triangles of half-inch iron pipe, fastened together by triangular cornerpieces—in fact, everything about it is triangular.

It rises eighty feet perpendicularly above the ground, but the wide-spreading supports are eighty-four feet long, and they span eighty-four feet of ground. It weighs less than five tons and, according to the estimates of Mr. Baldwin, it will carry with safety a weight of 50,000 pounds, and it was erected entirely without scaffolding or false work.

But, as the unique features of the tower lie even more in the methods of its construction and erection than in its appearance when completed, the guests were invited to an exposition of models and a stereopticon lecture in the general meeting room of the estate. Mr. Bell explained the principles of the tetrahedron, and showed by actual trial that eight tetrahedral cells made of pine sticks twenty-five centimeters long, and so fragile that they could be snapped easily between the fingers, could support the heaviest man in the audience, who weighed over two hundred pounds. He exhibited a new kite structure composed of over one thousand, three hundred cells, part of a forty-foot kite now being made with a manhole through it in which it is proposed to place a man and an engine. The feeling is irresistible, as one looks at this great complex of cells made by the same man who has enabled us to talk from city to city, that they are the elements—the bricks—out of which will be built up the great aerodromes of the future.

But the audience had come to hear how the tetrahedral tower had been constructed and what was to be expected from the development of the tetrahedral idea in steel and iron

construction, and so Mr. Baldwin reviewed the building of the tower by means of lantern slides.

Many Advantages.

One of the chief objects of this tower is to demonstrate that large structures can be economically built by this new unit method of tetrahedrons and to attract the attention of constructing engineers to its advantages in certain cases over the old forms of truss construction. Mr. Baldwin expects to introduce the tetrahedron into engineering work, and is looking for practical opportunities to explain its unique points of economy.

Each tetrahedron or tetrahedral unit of which the tower is built is made up of six pieces of half-inch gas pipe nearly four feet long and threaded at both ends with left and right handed threads. These pipes are screwed into four cast-iron corner pieces, each corner piece having three threaded holes to receive the ends of the pipes. When one of these tetrahedrons is put together it will support a weight on any of its four corners of 4,000 pounds. The individual cells, as these tetrahedrons are called, are fastened to each other by means of bolts running through the corner castings, which latter have flat triangular faces, enabling them to be tightly drawn to each other by the bolts.

In erecting the tower two of the legs, one inclosing a wooden staircase in its triangular interior, were completely built and fastened together on the ground, and the whole thing looked like a letter V as it lay there. The third leg was built by jacking up the apex of the v-shaped structure and putting in sections made of tetrahedral cells. As each section was slipped into place the—jacks were shifted below the new section of cells. In this way practically all of the work was done by men standing on the ground, or at least only a few feet above it, and the risk to life was decreased materially.

Library of Congress

Though composed of 260 separate cells, each four feet on a side, and though put together by men who had never handled plumbing tools before in their lives, the deflection in any of the 84-foot legs was not over three-eighths of an inch.

Some of the advantages of the tetrahedral method of construction which have been developed by Mr. Baldwin in building this tower are:

An admirable distribution of material especially due to the shortness of the compression members of the truss.

The ease with which the members can be assembled.

Extensive falsework is unnecessary.

Less-skilled labor can be employed.

Ease with which a structure can be repaired. For example a man can go over this whole tower and renew any weak pipes without moving it an eighth of an inch. Any cell can be removed and a new one put in its place without er?langering the structure.

Ease with which any increased strain can be provided for by simply shortening the lengths of pipes composing the tetrahedrons and putting in a number of small and consequently stronger cells in place of the larger, weaker ones.

It has many advantages for temporary structures.

The outlook tower of Beinn Bhreagh, therefore, will not only attract those who want to enjoy the superb panorama of the Bras d'Or lakes, but also those who are interested in its unique construction and the application of Mr. Bell's latest discovery to many kinds of steel and iron construction.